

d. Remarks

Amendments

The amendment to claim 1 is, e.g., supported by old claim 4 and at page 9, lines 20 - 21.

Claims 5 and 7 are rewritten in independent form to incorporate the features of old claims 1 and 3.

Claim 8 has been amended to correct punctuation.

Claim 9 is rewritten in independent form to incorporate the features of old claim 1.

New claim 10 is, e.g., supported by Figures 6A – 6B and at page 3, lines 11 – 14.

Objected to Claims 5, 7, and 9

Applicants have rewritten claims 5 and 7 to incorporate the features of base claim 1 and intervening claim 3. While the rewritten claims do not incorporate the features of old intervening claim 2, they should still be allowable, e.g., for the reasons stated at pages 2 – 3 of the Office Action.

Applicants have rewritten claim 9 to incorporate the features of base claim 1. Thus, claim 9 should be allowable as stated at pages 2 – 3 of the Office Action.

Rejections under 35 USC 102

At page 3, the Office action rejects claims 1 – 3, 6, and 8 as anticipated by U.S. Patent 5,757,993 (Herein, this patent is referred to as “Abe”).

While amended claim 1 recites that the GRIN lens attaches to “first and second waveguides [that] have fundamental propagation modes of different size”, Abe does not disclose such a feature. In particular, at the bottom of page 4, the Office Action admits that “Abe does not specifically teach wherein the first fiber has propagation modes with different sizes than the second fiber”. Since Abe does not disclose the above-recited feature of amended claim 1, Abe does not anticipate amended claim 1.

Claims 2 – 3, 6, and 8 are not anticipated by Abe, at least, due to their dependence on amended claim 1.

Rejections under 35 USC 103

At page 4, the Office action rejects claim 4 as obvious over Abe.

While amended claim 1 recites that the GRIN lens attaches to “first and second waveguides [that] have fundamental propagation modes of different size”, Abe does not disclose or suggest such a feature. Instead, Abe’s Figures 3 - 5 show GRIN lenses that couple pairs of seemingly identical optical fibers, i.e., optical fiber pair (24a, 24b) and optical fiber pair (14a, 14b). Also, Abe nowhere discloses a configuration where a GRIN lens couples optical fibers whose fundamental propagation modes have different sizes. The Office Action admits that Abe does not specifically teach such configurations at page 4, lines 20 – 22. Finally, Abe specifically discloses coupling matched optical fibers to a GRIN lens rather than suggesting to couple dissimilar optical fibers via a GRIN lens. For example, at col. 2, lines 25 – 31, Abe states:

In accordance with another aspect of the invention there is provided a method ... comprising ... providing at least two optical fibers each having an end with an expanded core, each of the ends having approximately the same diameters [sic], and coupling the expanded core ends to the GRIN lens system.”

Abe, col. 2, lines 25 – 31 (underlining added).

Coupling fibers whose ends have “approximately the same diameter” would not suggest coupling “fibers with different size fundamental modes” as recited in amended claim 1. Similarly, at col. 4, lines 20 – 24, Abe states:

To more efficiently couple light from one fiber to another, it is preferred to match the mode field. For example, in FIG. 4 the fibers 24a and 24b have typical core diameters of less than 4 μm and have matching expanded end faces of approximately 10 μm .

(Underlining added.)

Again, Abe suggests coupling matched optical fibers to the GRIN lens rather than coupling dissimilar optical fibers as recited in amended claim 1.

Abe nowhere suggests that a GRIN lens could produce “mode conversion” between dissimilar optical fibers. Abe suggests “efficiently coupling an optical fiber to a graded index (GRIN) lens”, Abe, col. 1, lines 9 – 10, rather than “improv[ing] the prior art of coupling the cores of optical fibers using GRIN lens ... that includes dissimilar fibers” as stated at page 5, lines 2 – 5, of the Office Action. For example, the title of Abe’s patent is “Method and Optical System for Passing Light Between an Optical Fiber

and Grin Lens” and not “Method and System for Passing Light Between Optical Fibers.” Even if col. 1, lines 35 – 37, describe coupling of dissimilar fibers, these lines refer to a coupling via a beam expanding end of a fiber rather than a coupling via a GRIN lens. Nothing in Abe suggests replacing such a beam expanding end with a GRIN lens. For these reasons, the Office Action’s recited motivation to modify Abe’s devices at page 5, lines 5 – 12, is simple hindsight. Using hindsight to find motivation to modify or combine prior art is impermissible in an obviousness rejection.

For the above reasons, amended claim 1 and claims dependent thereon are non-obvious over Abe.

Conclusion

For the above reasons, Applicants request allowance of claims 1 – 10 as presently pending.

In the event of any non-payment or improper payment of a required fee, the Commissioner is authorized to charge or to credit **Lucent Technologies Deposit Account No. 12-2325** to correct the error.

Respectfully,



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